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I have received no little information (or misinformation) from these two articles, but the point I made has been ignored.

The question in my mind resolves itself merely into this. Can a man teach biology without teaching the whole of the subject? Can he teach mathematics, unless he teach both arithmetic and quaternions? Can he teach modern languages unless he teach the whole 961 tongues? I claim that he can, and, words aside, this was the whole contention of my previous letter.

If a college or university is in position to give a well rounded biological education it is certainly its duty to do so, and I, as heartily as any one else, can find fault for short-comings in this respect. But if the institution be limited neither botanist nor zoologist should find fault because the biological training has a distinct trend towards either animals or plants, so long as it has a distinctly *biological* character, and it will have such a character if it regards its materials as a part of the living world. For the comfort of my critics I may add that the reason why the majority of such biological chairs are filled with animal biologists is because such have had on the whole the better training.— * * *

Pocket edition of Gray's Manual.

An announcement just made by the American Book Company, publishers of Gray's botanies, possesses unusual interest for botanists. It is of a special edition of the Manual "in small and compact form for satchel use." This is to be printed on thin French paper with narrow margins, so as to make it small and thin. It will be bound in full leather, limp, and cut flush, very much like a foreign guide book. The binding is to be on parchment strips such as are used in the best English prayer books, and the book is intended to stand rough usage. To many it will be a matter of sincere congratulation, that we are to have the indispensable "Manual" in field form. Its issue may be looked to with interest, since it is to be sold at the moderate price of two dollars.— AUG. D. SELBY, *Columbus*, *Ohio.*

NOTES AND NEWS.

DR. C. F. MILLSPAUGH, in *Zoe* (Jan.), describes two new Euphorbias from Lower California.

THE *Annals of Botany* proposes hereafter to give considerable prominence to systematic botany.

IT IS REPORTED that Pachystima Canbyi is in successful cultivation in the public gardens of Münden, Germany.

MR. F. W. ANDERSON is drawing the 60 plates to illustrate Mrs. E. G. Britton's Handbook of Mosses of N. E. America, which is in preparation.

MR. HEMSLEY'S place in the Kew Herbarium, left vacant by his promotion, has been filled by the appointment of Dr. Otto Stapf, of Vienna.

A CONVENIENT KEY to the genera and species of British mosses is published (with a plate) by Rev. H. G. Jameson in the last *Journal of Botany* (Feb.).

MR. F. H. KNOWLTON, of the U. S. Geol. Survey, has published an account of fossil woods and lignites from Arkansas. Two new conifers (Cupressinoxylon) and two new dicotyls (Laurinoxylon) are described and figured.

IN THE *Philadelphia Public Ledger* of Jan. 20, Mr. Thomas Meehan publishes an interesting account of an almost forgotten botanist, Mathias Kin, a man well know to Muhlenberg and Collins, and about whom Dr. Asa Gray wrote that his history should be worked up by Philadelphia botanists.

IN AN INAUGURAL dissertation at Erlangen, Georg Schneider shows that the "wax" of Myrica cerifera is more nearly allied to the fats than to the wax-like bodies. It consists chiefly of palmatin (70 per cent.) myristin (8 per cent.) and lauric acid (4.7 per cent., mostly free), to form which 9.4 per cent. of glycerin is combined with the corresponding fatty acids.

SOME ACCOUNT of the occurrence and life history of the clover rust (*Uromyces Trifolii* Wint.) has been published by Miss J. K. Howell, (Bull. Cornell Exper. Station, No. 24). The uredo stage was produced upon both red and white clover plants by artificial sowing of the æcidiospores. Attempts to germinate the teleutospores in the spring unexpectedly proved quite fruitless.

DR. JOSEPH BOEHM has at least the merit of consistency in the framing of his theory of transpiring plants. It follows, he says to the Royal Botanical Society of Vienna,[1] since capillarity is the cause of the absorption and ascent of water in transpiring plants, that under certain conditions the transpiration stream may be reversed, so that water must escape from the plant into the ground!

IN THE last *Bulletin of the Torrey Botanical Club* (Feb.) Dr. Morong gives an interesting account of the flora of the desert of Atacama. In the same number Dr. Britton describes six new plants from Dr. Rusby's S. American collection, belonging to the following genera: Begonia, Hariota, Hydrocotyle, Arracacia, Sciadophyllum, and Oreopanax; and Mrs. Britton describes and figures two new Idaho mosses, a Grimmia and a Bryum.

THE PRODUCT of marketable shoots of asparagus is found by W. J. Green (Bull. Ohio Exper. Station, iii, p. 241) to be fifty per cent greater from male plants than from female plants. Preliminary tests were made in 1889, and more complete tests in 1890. During the latter year 50 plants of each kind were used. The difference in vigor is ascribed to the exhaustive effect of seed bearing in the female plants, which is absent in the male plants.

PROF. DR. F. B. POWER and Mr. J. Cambier have recently examined chemically two of the best known "loco-weeds," Astragalus mollissimus and Crotalaria sagittalis. They close their paper in *Pharm. Rund-*

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[1] Bot. Centralb. xliv, 355.

schau (Jan.) by saying: "These results have afforded us the conviction that both the Astragalus and the Crotalaria contain very small amounts of toxic alkaloids, to which we believe the symptoms of poisoning produced by these plants may reasonably be attributed.

IT IS WELL established that the ovules of the higher plants are homologous with the sporangia of vascular cryptogams. The sporangia in the latter are produced on leaf-structures—the sporophylls. In the Angiosperms the question of their origin is unsettled. Gœbel investigated a considerable number of doubtful cases. His results are confirmed and extended by Schaefer[1] who finds that in all cases the placenta develops as a part of the carpel and not in the axil of the carpel.

MR. CHARLES ROBERTSON has continued his interesting series of observations on flowers and insects by publishing the *Umbelliferæ* in *Trans. St. Louis Acad. Sci.* (vol. v, no. 3). The group is so uniform in flower-structure, and the species bloom so continuously through the growing season, that they are specially favorable for investigation concerning the effect of time of blooming on the character of the visitors. In his general review of the order Mr. Robertson draws some very interesting conclusions, which are too numerous and specific to be enumerated here.

THE REPORT of the botanist of the Department of Agriculture for 1890 will show that the following collectors have been at work during the year in unexplored or interesting regions: Dr. Edward Palmer in Lower California, Western Mexico, and Arizona; Mr. G. C. Nealley in Western Texas; Mr. J. H. Simpson in the region about Manatee, Florida; and Mr. C. R. Orcutt in the Colorado Desert of Southern California. All these collections either have been or will be reported upon in the new series of "Contributions" now being issued by the National Herbarium.

IN THE *Amer. Chem. Jour.* (xiii, 1) Dr. H. W. Wiley gives an account of "pine-tree honey-dew" and "pine-tree honey." His conclusion is that the "honey-like exudation of the pine tree differs in a marked degree from the honeys of ordinary plants in being right-handed, from a polariscopic point of view, and containing bodies not sucrose nor invert sugar, with a specific rotatory power of about 105." Honey made from this pine-exudation is naturally right-handed, a character as yet observed to be possessed by no genuine honey collected in this country.

HERETOFORE no cells have been recognized in the vascular bundles of the Gymnosperms, which were either the anatomical or physiological representatives of the "companion-cells" of the sieve-tubes. Strasburger, however, now considers the parenchyma cells, rich in protoplasm, which surround the sieve-tubes or are distributed between them as the physiological equivalents of the companion cells. These cells stand in intimate physiological and anatomical relations with the sieve tissue, by means of pits.—Cf. Sitz. d. königl. Preuss. Akad. d. Wiss. zu Berlin. 1890. xiii.—Abstr. in Bot. Cent. xliv. 192.

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[1] Flora, 1890, heft 1, *fide* Bot. Cent. xliv, 368.

F. LUDWIG finds in the Synchytrium-galls on Anemone nemorosa a red coloring matter, readily soluble in water, whose identity with anthocyanin he has established. It is a derivative of tannin. He raises the question as to its significance—whether it is a purely pathological product, or whether it serves as a protection to the fungus against snails. He points out the general red coloration and abundance of tannin in insect galls and reminds his readers of Stahl's researches which show the avoidance of tannin-bearing plants by snails. —Cf. Verh. bot. Ver. d. Prov. Brand. xxxi. p. vii, and Bot. Cent. xliv. 82.

THREE NEW methods of preparing aleurone grains of Ricinus are as follows: 1. The Overton method.[1] After hardening sections for several hours in absolute alcohol, immerse them in an aqueous solution of gallotannic acid. The crystalloids absorb the acid and become brownish on treatment with 1 per cent. osmic acid. After washing in distilled water place in glycerine. 2. Poulsen's methods.[2] (*a*) Harden in absolute alcohol 24 hours; place for an hour in a 25 per cent. aqueous solution of tannic acid; wash in distilled water; place in an aqueous solution of bichromate of potassium and allow to remain until brown. Wash and preserve in glycerine. (*b*) Treat as in (*a*) but use a 10–20 per cent. aqueous solution of sulphate of iron (which results in a deep blue coloration), wash, dehydrate, clear with clove oil and mount in balsam.

PFEFFER criticizes the conclusions of Hugo de Vries and his pupils as to the origin of vacuoles and the plasma membranes of the cell. (For these views see notes in this journal, xiv. 24, 137.) Pfeffer however affirms[3] that he has been able to produce vacuoles artificially in the plasmodium of Chondrioderma difforme by causing it to enclose solid particles of various soluble substances. The artificial vacuoles were in no wise distinguishable from the true. He also observed the division and fusion of these vacuoles, as well as their fusion with a pulsating vacuole. In some cases they even showed a slight pulsation themselves. His criticisms on the existence, origin and significance of the membrane surrounding the plasma and the membrane enclosing the vacuole are equally radical. A clear insight into these structures seems not yet reached.

THE PRESS, a daily paper of Christchurch, New Zealand, bearing date of Jan. 16, has just been received, giving account of the opening sessions of the other A. A. A. S., the Australasian Association for the Advancement of Science. The sessions began January 15, at Christchurch, in Canterbury College, with the distinguished botanist Baron von Mueller in the chair as retiring president. The proceedings are reported in full, and the whole affair seems full of an energy and spirit which augur well for the future of the younger A. A. A. S. It will be remembered that at the Indianapolis meeting of the American Association the retiring President, Dr. Geo. L. Goodale, was appointed as representative to the Australasian Association. The New Zealand paper gives an account of his cordial reception by the association, and his address in reply. An interview with Prof. Goodale is also printed, in which he gives the Australasians much information concerning science in America, the American Association, and Harvard University. Prof. Goodale is travelling chiefly in the interests of the new Botanical Museum at Cambridge, and will return home by way of Java, China, and Japan.

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[1] Cf. Bot. Cent. xliv, 1 (1890).

[2] Rev. gen. de Botanique, ii, 547.

[3] Abhand. d. Math.-Phys. Class. d. Sachs. Gesells. d. Wiss. xvi, p. 185—345. —Abstr. in Bot. Cent. xliv. 180.

THE PHYSIOLOGICAL significance of calcic oxalate according to Dr. G. F. Kohl[1] lies in the fact that the oxalic acid and its congeners are by-products in the synthesis of proteids from amides and carbohydrates. If this is true oxalic acid and its salts ought to occur in all plants. While however calcic oxalate in the higher plants is very wide-spread, in the thallophytes it is strikingly rare. Kohl shows that nevertheless oxalic acid is abundantly produced by both fungi and algæ, and that it will readily combine with calcium when under proper conidtions. The production of oxalic acid by the recently described Saccharomyces Hansenii has been designated as oxalic acid fermentation which is reckoned as one of the oxidative fermentations, in contrast to the splitting fermentations. Fermentation is in all cases, he says, nothing but a nutritive process of the ferment-inducing organisms, with its consequences. Colorless organisms must decompose—*ferment*— carbohydrates, alcohols, etc., obtained from without; color-bearing and therefore mostly CO_2-assimilating organisms on the contrary decompose—*ferment*—self-formed carbohydrates, etc. Logically we must say: *all plants are fermenting agents;* for if we call the formation of oxalic acid by a fungus "oxalic-acid fermentation" we must extend this designation to all plants in which the formation of oxalic acid occurs. We can arrange plants in two series according to the main product of the fermentation, the first including those which induce oxidative fermentations, the second including the agents of splitting fermentations.

Plants.	*Oxidative fermentation.*	*Splitting fermentation.*
Schizomycetes	acetic acid	Alcohol, lactic acid, butyric acid.
Numerous other fungi	oxalic acid carbonic acid	Alcohol.
Algæ	oxalic acid carbonic acid	————
Bryophytes, Pteridophytes, Phanerogams.	carbonic acid oxalic acid tartaric acid malic acid	————

The lower plants thus induce chiefly splitting fermentations, the higher exclusively oxidative.

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[1] Bot. Centralb. xliv. 337.